

Section Overview

Identifying Quadratic Functions

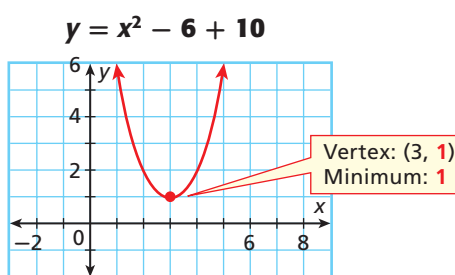
Lesson 9-1

Why? Quadratic functions are used in physics to find various heights of falling objects.

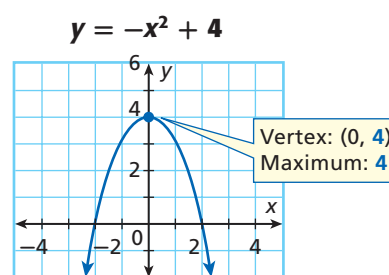
A **quadratic function** is any function that can be written in the form $y = ax^2 + bx + c$, where a , b , and c are real numbers and $a \neq 0$.

The **graph** of every quadratic function is a **parabola**.

Maximums and Minimums of Parabolas



If $a > 0$,
the parabola opens **upward**.



If $a < 0$,
the parabola opens **downward**.

Graphing Quadratic Functions

Lessons 9-2, 9-3

Why? Since the graph of a quadratic function is a parabola, it is symmetrical. You can use the axis of symmetry to help determine what other points to find that will help graph the parabola.

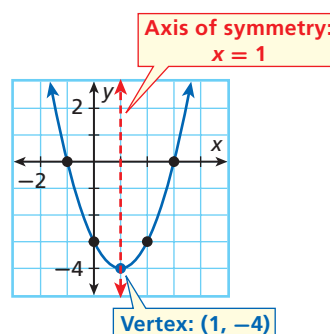
Graph $y = x^2 - 2x - 3$.

First find the **axis of symmetry**. Then use that value to find the **vertex**.

$$x = \frac{-b}{2a} = \frac{-(-2)}{2(1)} = 1$$

Then choose x -values that are to the left and right of the axis to find other points on the parabola.

x	(x, y)
-1	$(-1, 0)$
0	$(0, -3)$
1	$(1, -4)$
2	$(2, -3)$
3	$(3, 0)$

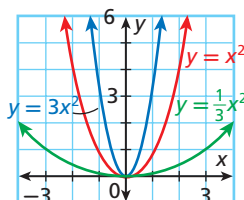


Transforming Quadratic Functions

Lesson 9-4

Why? Knowing how parameter changes affect the graph of a quadratic function allows students to sketch the graph without plotting points.

The graph of $y = ax^2$ becomes **narrower** as $|a|$ **increases** and **wider** as $|a|$ **decreases**.



The graph of $y = x^2 + c$ is translated **up** when $c > 0$ and **down** when $c < 0$.

